

HYDRODYNAMIC, KINETIC MODES
OF PLASMA AND RELAXATION DAMPING
OF PLASMA OSCILLATIONS

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S u m m a r y

The hydrodynamics of a completely ionized two-component electron-ion plasma is investigated at the end of the component temperature and velocity relaxation. The problem of accounting for the peculiarities of the Coulomb interaction in the plasma kinetics is discussed. The investigation is based on the Landau kinetic equation and the Chapman–Enskog method generalized on the basis of the Bogolyubov idea of the functional hypothesis. Nonlinear hydrodynamic equations are obtained. Linearized hydrodynamic equations are built, and the hydrodynamic and kinetic modes of the Landau kinetic equation are investigated in the hydrodynamic approximation. The effect of the relaxation processes on the evolution of the system is investigated. On the basis of the Vlasov–Landau equation, the plasma modes are investigated in the main hydrodynamic approximation. Some of them describe the relaxation damping of plasma oscillations, which is much more important than the Landau damping at small wave vectors $k \rightarrow 0$.